

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (Currently amended) A slide drive device for a press machine, comprising:
a slide;
said slide including a top and a bottom dead center position;
a single adjusting means for permitting an adjustment of a stroke of said slide; and
said adjusting means simultaneously adjusting said top and bottom dead center positions
by a same amount.

2. (Previously amended) A slide drive device, according to claim 1, further comprising:
a driving means for driving of said slide drive device;
at least a first upper link;
said first upper link being connected to drive said slide in a cycle;
said driving means transmitting a driving displacement to said first upper link to drive
said slide in said cycle; and
said means for driving transmitting said adjustment to said slide whereby said stroke is
adjusted.

3. (Original) A slide drive device, according to claim 2, further comprising:
dynamically balancing means for permitting dynamic balancing of said slide drive
device;
a dynamic balancer operably connected to said slide;
said dynamically balancing means connected to said dynamic balancer;
said dynamically balancing means being operably connected to move said dynamic
balancer opposite said slide in said cycle;
said means for driving connected to transmit said driving displacement to said
dynamically balancing means; and

said dynamically balancing means moving said dynamic balancer opposite said slide in said cycle whereby said dynamic balancer operates to dampen vibration from said slide.

4. (Original) A slide drive device, according to claim 3, further comprising:
guiding means for guiding of said slide drive device;
at least a first horizontal link;
said first horizontal link operably connecting to said slide;
said guiding means guiding said first horizontal link in said cycle;
said driving means including said guiding means; and
said guiding means guiding said adjustment and said driving displacement to said slide whereby said stroke is adjusted.

5. (Currently amended) A slide drive device, according to claim 4, further comprising:
a crankshaft;
first and second connecting rods on said crankshaft;
said first and said second connecting ~~rod~~ rods receiving a reciprocating motion and transmitting said reciprocating motion to said means for driving;
said first and said second connecting ~~rod~~ rods and said means for driving being effective to transmit said reciprocating motion to said dynamically balancing means; and
said guiding means being effective to convert said reciprocating motion to a guiding displacement, whereby said slide operates in said cycle.

6. (Previously amended) A slide drive device, according to claim 5, further comprising:
said at least first upper link having a first length (a);
at least a first middle link;
a center fulcrum pin on said first middle link;
said first upper link operably connecting to said first middle link at said center fulcrum pin;
a first and second end on said first middle link;

said first connecting rod operably coupled to said second end;

said first middle link comprising a second length (b) measured between said first end and said center fulcrum pin, and a third length (c) measured between said second end and said center fulcrum pin; and

said first, second, and third lengths having the following relationship:

$$(a):(b) = (b):(c) \quad (V)$$

whereby said first connecting rod transmits said driving displacement to said first upper link and said first middle link and driving means reduces a slide speed adjacent said bottom dead center position and increases said slide speed distal said bottom dead center position.

7. (Previously amended) A slide drive device for a press machine having a slide, comprising:

a slide;

said slide having a top and a bottom dead center position;

a single adjusting means for adjusting a stroke of said slide;

said adjusting means simultaneously adjusting said top and bottom dead center positions by a same amount;

a driving means for permitting driving of said slide drive device;

at least a first upper link;

said first upper link being connected to drive said slide in a cycle;

said driving means transmitting a driving displacement to said slide to drive said slide in said cycle; and

said driving means transmitting said adjustment to said slide whereby said stroke is adjusted.

8. (Currently amended) A slide drive device, according to claim 7, further comprising:

a guiding means for guiding of said slide drive device;

at least a first horizontal link;

~~first and~~ a second linear guides guide;

said first and second connecting ~~rod~~ rods receiving a reciprocating motion and transmitting said reciprocating motion to said driving means;

said driving means being effective to transmit said reciprocating motion to said dynamically balancing means; and

a guiding means being effective to convert said reciprocating motion to a said guiding displacement, whereby said slide operates in said cycle.

11. (Currently amended) A slide drive device, according to claim 10, further comprising:
a small and a large end on said ~~one~~ first connecting rod;
said large end operably attached to said ~~one~~ first eccentric part;
said small end operably attached to said driving means; and
said small end reciprocating linearly to a rotation center of said ~~crank-shaft~~ crankshaft
whereby said driving displacement is transmitted to said slide.

12. (Currently amended) A slide drive device, according to claim 11, further comprising:
at least a first upper link;
said first upper link operable about a fixed fulcrum pin;
said at least one upper link having a first length (a);
at least a first middle link;
a center fulcrum pin on said first middle link;
said first upper link pivotably joined to said ~~one~~ first middle link at said center fulcrum pin;
a first and second end on said ~~one~~ first middle link;
said ~~one~~ first connecting rod operably coupled to said second end;
said ~~one~~ first middle link comprising a second length (b) measured between said first end and said center fulcrum pin, and a third length (c) measured between said second end and said center fulcrum pin; and
said first, second, and third lengths having the following relationship:
$$(a):(b) = (b):(c)$$

(VI)

whereby said ~~one~~ first connecting rod transmits said driving displacement to said first upper link and said first middle link and said driving means drives said slide in said cycle and reduces a slide speed adjacent said bottom dead center position and increases said slide speed distal said bottom dead center position.

13. (Currently amended) A slide drive device, according to claim 12, further comprising:
a guide pin;
said guide pin guiding said dynamic balancer opposite said slide;
a balancer pin;
said balancer pin operably joined to said dynamic balancer;
a balancer link;
said balancer link operably joining said balancer pin to said ~~one~~ first connecting rod;
said balancer link receiving said driving displacement and transmitting said guiding displacement to said dynamic balancer whereby said dynamic balancer operates opposite said slide and substantially eliminates vibration; and
said dynamic balancing means having a shape adapted to said driving means whereby said slide drive device is compact in size.

14. (Original) A slide drive device, according to claim 13, wherein:
said balancer pin is vertically aligned with said fixed fulcrum pin.

15. (Currently amended) A slide drive device, according to claim 14, further comprising:
a first linear guide;
said first linear guide vertically aligned with said fixed fulcrum pin and said balancer pin;
a first slider operably slidable in said first linear guide;
said first end of said ~~one~~ first middle link operably joined to said first slider;
said ~~one~~ first middle link operably transmitting said driving displacement from said ~~one~~
first connecting link ~~rod~~ rod to said first slider;
at least one of a first and second lower link;

a first and second side on said one horizontal link;
said first side operably joined to said second slider;
said second side operably joined to said one lower link;
said one lower link operably joining said first slider and said one horizontal link; and
said first slider being effective to convert said driving displacement to a linear displacement whereby said one lower link operably drives said one horizontal link and said slide in said cycle.

16. (Previously amended) A slide drive device, for a press machine having a slide, comprising:

a single means for adjusting said slide drive device;
a crankshaft;
a first eccentric part on said crankshaft;
a second eccentric part on said crankshaft;
said first and second eccentric parts operably opposing each other about a rotation center of said crankshaft;
a first and second connecting rod;
said connecting rods operably joined to said eccentric parts;
said connecting rods receiving a driving displacement from said crankshaft;
a first and second upper link;
said upper links operable about a fixed fulcrum pin;
a first and second middle link;
said middle links having first and second ends;
said connecting rods effective to transfer said driving displacement to said middle links at said second ends;
said upper links operably joined to said middle link at a center fulcrum point between said first and second ends;
said middle links effective to transfer said driving displacement to said upper links;

said dynamic balancing means operably moving a dynamic balancer opposite said slide in said cycle;

a guide pin operably guiding said dynamic balancer during said cycle;

said guide pin vertically aligned with said fixed fulcrum pin;

said dynamic balancing means driven by said one connecting rod; and

said dynamic balancing means being effective to counter a momentive force of said slide and said one connecting rod whereby said slide operates in said cycle with substantially lower vibration.